

REMARKS

The Office Action dated June 2, 2004, has been received and reviewed.

Claims 31-35 and 37-45 are currently pending and under consideration in the above-referenced application, each standing rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 37-41, 44, and 45 stand rejected under 35 U.S.C. § 112, first paragraph, for purportedly containing subject matter which was not adequately described in the specification.

Specifically, the Office has asserted that the as-filed specification does not provide support for “a HSG polysilicon layer on [a] storage poly structure and a dielectric material . . .” Office Action of November 20, 2004, pages 2 and 3.

The as-filed specification of the above-referenced application provides adequate written support for a structure that includes HSG polysilicon on a storage poly structure and for a structure which includes recesses that are lined with a dielectric material.

With respect to “a HSG polysilicon layer on [a] storage poly structure,” it is noted that the specification of the above-referenced application does not expressly describe that remaining portions of an HSG polysilicon layer are removed from a storage poly structure prior to the formation of a capacitor dielectric layer thereover. Leaving the HSG polysilicon in place would not be an affirmative act. From this description, one would reasonably conclude that the resulting structure includes HSG polysilicon.

Moreover, one of ordinary skill in the art would readily understand that it does not matter if any remaining HSG polysilicon remained in place on the storage poly structure, as the HSG polysilicon may have substantially the same electrical conductivity properties as the portions of the polysilicon layer that underlie any remaining HSG. This is one of the reasons why, following the patterning of the underlying polysilicon layer, the HSG polysilicon does not appear as a separate element.

Further, to many of skill in the art, the extra process steps that would be required to remove the HSG polysilicon would be undesirable, as such processing would not only remove

the HSG, but also the polysilicon beneath the HSG. The potential consequences of such processing would be damage to the capacitor electrode, as well as failure of the resulting device.

It is, therefore, respectfully submitted that the as-filed specification of the above-referenced application provides one of ordinary skill in the art with an adequate written description of the subject matter recited in claims 37-41, 44, and 45.

The as-filed specification of the above-referenced application also provides an adequate written description of a “dielectric material at least lining . . . recesses,” as recited in claims 37-41, 44, and 45.

In particular, FIG. 10 illustrates a capacitor structure in which recesses, or “openings 134” (page 8, lines 21-23), are lined with a “dielectric material layer 138” (page 8, lines 23-26). Page 11, line 28, to page 12, line 3, of the as-filed specification also describes “depositing a dielectric material layer over [an] etched structure 152 . . .”

It is, therefore, respectfully submitted that the as-filed specification of the above-referenced application provides an adequate written description of the dielectric layer recited in claims 37-41, 44, and 45.

For these reasons, each of claims 37-41, 44, and 45 complies with the requirements of the first paragraph of 35 U.S.C. § 112. Accordingly, the 35 U.S.C. § 112, first paragraph, rejections of claims 37-41, 44, and 45 should be withdrawn.

Rejections Under 35 U.S.C. § 102(b)

Claims 31-35 and 37-45 stand rejected under 35 U.S.C. § 102(b) for being directed to subject matter which is allegedly anticipated by the disclosure of U.S. Patent 5,256,587 to Jun et al. (hereinafter “Jun”).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Jun describes patterned polysilicon structures that include upwardly protruding “fingers.” See FIGs. 4a-4d. Portions of hemispherical grain particles 14 may remain on upper ends of the

fingers. *See* FIG. 4d. In addition, an insulation layer 15, which acts as a mask, may be located over the remaining portions of the hemispherical grain particles 14 that remain on the upper ends of the fingers. *See id.*

It has been asserted that FIG. 4d of Jun expressly describes a structure which includes “contiguous” HSG particles. In viewing FIG. 4d, it is clear that portions of adjacent HSG particles may be contiguous with one another, but the resulting structures do not include “contiguous” “mesas,” “webs,” or “low elevation regions.”

The Office has also noted, at pages 7-9 of the Office Action dated June 2, 2004, that there are only two reasonable interpretations of “contiguous mesas” and “contiguous webs”; *i.e.*, that “contiguous” refers either to the top surfaces of the bases of the storage poly. In addition, it appears that these comments are based on the misconception that the term “contiguous” means that every portion of a storage poly structure or other structure be contiguous with another portion thereof. There is no such requirement in the claims. Rather, each claim of the above-referenced application merely requires that some portions of a storage poly structure or other structure be contiguous with one another, leaving open the possibility that a structure that includes a structure with one or more noncontiguous regions also falls within the scope thereof.

Independent claim 31 is directed to a semiconductor storage capacitor poly that includes downwardly extending recesses and a plurality of contiguous mesas that comprise a plurality of contiguous top surfaces forming a maze-like structure.

Jun lacks any express or inherent description of a structure that includes a storage poly with contiguous top surfaces that form a maze-like structure. Instead, the disclosure of Jun is limited to a structure that includes spaced-apart fingers, which do not form anything resembling a “maze-like structure.”

Therefore, the disclosure of Jun does not anticipate each and every element of independent claim 31, as would be required to maintain the 35 U.S.C. § 102(b) rejection of independent claim 31.

Claim 32 is allowable, among other reasons, as depending from claim 31, which is allowable.

Independent claim 33 also recites a semiconductor capacitor storage poly. The capacitor storage poly of independent claim 33 includes downwardly extending recesses, a plurality of contiguous webs that comprise contiguous top surfaces, and HSG polysilicon on at least some of the contiguous top surfaces.

Again, the disclosure of Jun is limited to structures that include spaced-apart “fingers.” Thus, Jun includes no express or inherent description of a storage poly that includes “a plurality of contiguous webs comprising a plurality of contiguous top surfaces” or anything resembling a “maze-like structure.”

Therefore, the subject matter described in Jun does not anticipate that recited in independent claim 33. Accordingly, under 35 U.S.C. § 102(b), independent claim 33 recites subject matter which is allowable over the subject matter described in Jun.

Claim 34 is allowable, among other reasons, as depending from claim 33, which is allowable.

Independent claim 35 recites an intermediate semiconductor capacitor structure that includes a storage poly structure comprising a plurality of contiguous mesas, a contiguous HSG polysilicon layer on and in contact with the storage poly structure, and a mask over the HSG polysilicon layer. Recesses in the storage poly structure are exposed through the contiguous HSG polysilicon layer and the mask.

Jun neither expressly nor inherently describes a storage poly structure with a plurality of contiguous mesas. Instead, Jun merely describes a storage poly structure with a plurality of spaced-apart “fingers.” As the “fingers” of the storage poly structure of Jun are spaced apart from one another, they cannot comprise a plurality of contiguous mesas, as is required by independent claim 35.

Therefore, Jun does not anticipate each and every element of independent claim 35, as would be required to maintain the 35 U.S.C. § 102(b) rejection of independent claim 35.

Independent claim 37 recites an intermediate semiconductor memory cell structure that includes a storage poly structure, a plurality of contiguous low elevation regions of an HSG polysilicon layer on and in contact with the storage poly structure, recesses formed in the storage

poly structure laterally between the low elevation regions, and dielectric material at least lining the recesses.

The portions of the structures shown in Jun that would be analogous to the “low elevation regions of [the] HSG polysilicon layer” recited in independent claim 37 are the remaining portions of the hemispherical grain particles 14 shown in FIGs. 4c and 4d of Jun. While the portions of the polysilicon grains or particles of each low elevation region of the HSG polysilicon layer of Jun may remain over each “finger” of the storage poly structure described therein, Jun does not expressly or inherently describe that any of the low elevation regions may be contiguous with one another, as recited in independent claim 37.

It is, therefore, respectfully submitted that Jun does not anticipate each and every element of independent claim 37. As such, it is respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 37 recites subject matter which is allowable over that described in Jun.

Independent claim 38 recites a semiconductor memory cell structure that includes “regions of hemispherical-grain polysilicon on at least portions of an upper surface of the storage poly structure . . . and a dielectric layer substantially coating an upper surface of the storage poly structure and substantially lining each of [a] plurality of recesses.” The plurality of recesses impart the storage poly structure with a structure that resembles a plurality of contiguous mesas.

Jun neither expressly nor inherently describes that the polysilicon “fingers” described therein resemble “a plurality of contiguous mesas,” as is required by independent claim 38.

Therefore, Jun does not anticipate each and every element of independent claim 38, as would be required to maintain the 35 U.S.C. § 102(b) rejection thereof. Accordingly, it is respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 38 is directed to subject matter which is allowable over the disclosure of Jun.

Each of claims 39-41 is allowable, among other reasons, for depending either directly or indirectly from claim 38.

Claim 40 is further allowable since Jun lacks any express or inherent description of a semiconductor memory cell structure that includes HSG having a web-like appearance. Instead, the description of Jun is limited to isolated low elevation regions of a hemispherical grain polysilicon layer.

Independent claim 42 recites an intermediate semiconductor capacitor structure that includes a storage poly structure, a substantially confluent HSG polysilicon layer on the storage poly structure, and a mask positioned over the HSG polysilicon layer. Planarized portions of the HSG polysilicon layer are exposed through the mask.

The description of Jun is limited to processes in which upper elevation portions of the hemispherical grain particles 14 disclosed therein protrude from the dielectric layer 16. Jun does not expressly or inherently describe a structure which includes planarized portions of a hemispherical-grain polysilicon layer that are exposed through a mask, as recited in independent claim 42.

Therefore, Jun does not anticipate each and every element of independent claim 42. It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 42 is drawn to subject matter which is allowable over the subject matter described in Jun.

Independent claim 43 also recites an intermediate semiconductor capacitor structure. The intermediate semiconductor capacitor structure of independent claim 43 includes a storage poly structure with recesses therein, remaining portions of an HSG polysilicon layer substantially overlying upper portions of the storage poly structure, and a mask positioned over the HSG polysilicon layer. The HSG polysilicon layer has a web-like appearance. The mask is located laterally between the recesses in the storage poly structure, with the recesses being exposed therethrough, and is substantially spaced apart from the storage poly structure by way of the remaining portions of HSG polysilicon layer.

Independent claim 44 recites an intermediate semiconductor capacitor structure that includes a storage poly structure with recesses therein, an HSG polysilicon layer having a web-like appearance on at least portions of the storage poly structure, and dielectric material lining at least the recesses.

Independent claim 45 is directed to an intermediate semiconductor memory cell structure that includes a storage poly with recesses therein, low elevation regions of an HSG polysilicon layer substantially covering an upper surface of the storage poly structure, and dielectric material

at least lining the recesses. The HSG polysilicon layer of independent claim 45 has a web-like appearance.

As noted previously herein, the description of Jun is limited to remainders of low elevation regions of a hemispherical grain polysilicon layer that are isolated from one another. Jun does not expressly or inherently describe that any of the remaining portions of the hemispherical grain polysilicon layer disclosed therein have a collective web-like appearance, as recited in each of independent claims 43, 44, and 45.

Therefore, Jun does not anticipate each and every element of any of independent claims 43, 44, or 45, as would be required to maintain the 35 U.S.C. § 102(b) rejections of these claims.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 102(b) rejections of claims 31-35 and 37-45 be withdrawn.

CONCLUSION

It is respectfully submitted that each of claims 31-35 and 37-45 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



Brick G. Power
Registration No. 38,581
Attorney for Applicants
TRASKBRITT, PC
P.O. Box 2550
Salt Lake City, Utah 84110-2550
Telephone: 801-532-1922

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